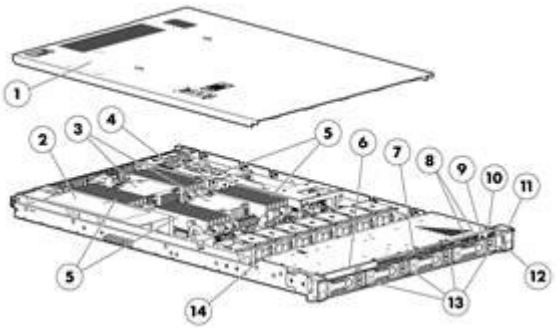
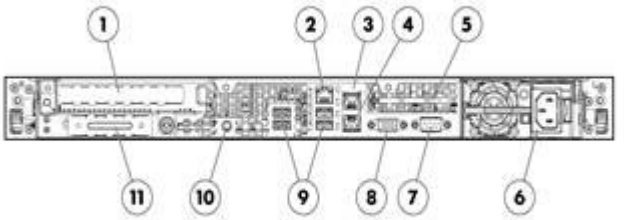
Overview

The HP ProLiant DL160 Gen8 is a dual-socket, high-performance, dense rack server with enhanced manageability and scalability suited for High Performance Computing (HPC) environments, web serving and other hyperscale environments.

Hot Plug SAS/SATA





Front View:

1. Access panel
2. Power supply (500 Watts multi-output - standard, common slot power supply factory installable options available)
3. Up to two Intel® Xeon® E5-2600 Series processors
4. FlexibleLOM slot
5. Up to 24 DIMM slots: DDR3 Registered (RDIMM) or Unbuffered (UDIMM) memory
6. Optical Disk Drive Bay
7. Serial label pull tab
8. (2) Front USB connectors
9. UID LED button
10. Power On/Standby button
11. Health LED
12. Aggregate network LED
13. Up to 4 LFF SAS/ SATA Hard drives
14. (7) Non hot plug redundant Fans

Rear View:

1. PCIe 3.0 Riser card slot
2. Integrated Lights-Out Management Engine port
3. 1 GbE LAN port for NIC 1 (RJ-45)
4. 1 GbE LAN port for NIC 1 (RJ-45)
5. Torx tool
6. Power supply cable socket
7. Serial connector
8. Video connector
9. USB connectors
10. UID LED button
11. FlexibleLOM slots

Standard Features

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

Processor One of the following depending on Model	Eight -Core Processors Intel® Xeon® E5-2680 (2.7GHz/8-core/20MB/8GT-s QPI/130W, DDR3-1600, HT, Turbo2-4/4/5/5/5/7/8/8) Intel® Xeon® E5-2670 (2.6GHz/8-core/20MB/8GT-s QPI/115W, DDR3-1600, HT, Turbo2-4/4/5/5/6/6/7/7) Intel® Xeon® E5-2665 (2.4GHz/8-core/20MB/8GT-s QPI/115W, DDR3-1600, HT, Turbo2-4/4/5/5/6/6/7/7) Intel® Xeon® E5-2660 (2.2GHz/8-core/20MB/8GT-s QPI/95W, DDR3-1600, HT, Turbo2-5/5/6/6/7/7/8/8) Intel® Xeon® E5-2650 (2.0GHz/8-core/20MB/8GT-s QPI/95W, DDR3-1600, HT, Turbo2-4/4/5/5/5/7/8/8) Intel® Xeon® E5-2650L (1.8GHz/8-core/20MB/8.0 GT-s QPI/70W, DDR3-1600, HT, Turbo2-2/2/3/3/4/4/5/5) Six-Core Processors Intel® Xeon® E5-2667 (2.9GHz/6-core/15MB/8GT-s QPI/130W, DDR3-1600, HT, Turbo2-3/3/3/4/5/6) Intel® Xeon® E5-2640 (2.5GHz/6-core/15MB/7.2GT-s QPI/95W, DDR3-1333, HT, Turbo2-3/3/4/4/5/5) Intel® Xeon® E5-2630 (2.3GHz/6-core/15MB/7.2GT-s QPI/95W, DDR3-1333, HT, Turbo2-3/3/4/4/5/5) Intel® Xeon® E5-2630L (2.0GHz/6-core/15MB/8.0GT-s QPI/60W, DDR3-1333, HT, Turbo2-3/3/4/4/5/5) Intel® Xeon® E5-2620 (2.0GHz/6-core/15MB/7.2GT-s QPI/95W, DDR3-1333, HT, Turbo2-3/3/4/4/5/5) Quad- Core Processors Intel® Xeon® E5-2609 (2.4GHz/4-core/10MB/6.4GT-s QPI/80W) Intel® Xeon® E5-2603 (1.8GHz/4-core/10MB/6.4GT-s QPI/80W) Dual- Core Processors Intel® Xeon® E5-2637 (3.0GHz/2-core/5MB/8.0GT-s QPI/80W, DDR3-1600, HT, Turbo2- 2/2) NOTE: Up to 2 processors supported. NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology. NOTE: Turbo 2 indicates the maximum potential bin increments when using Intel® Turbo Boost Technology, with 8, 7,6,5,4,3,2 and 1 cores active DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed (options for 1600, 1333, 1066MHz). NOTE: For the Intel® C600 Chipset E5-2600 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 2600x v#, 2 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, x = L for low power SKUs and v# (not yet designated) = version number.

Standard Features

Cache Memory One of the following depending on Model	20MB (1x20MB) Level 3 cache NOTE: For Eight-core processors. 15MB (1x15MB) Level 3 cache NOTE: For Six-core processors. 10MB (1x10MB) Level 3 cache NOTE: For Quad-core processors. 5MB (1x5MB) Level 3 cache NOTE: For Dual-core processors. NOTE: All processor models above list the L3 Cache associated with that particular processor.
Chipset	Intel® C600 Chipset Intel® E5-2600 processor Family NOTE: For more information regarding Intel® chipsets, please see the following URL: http://www.intel.com/products/server/chipsets/
Upgradeability	Upgradeable to two processors (16 Cores) Up to 24 DIMM slots available for higher Memory capacity Up to 8 SFF Hard Drive Bays; Or 4 LFF Drive Bay 2 PCIe Generation 3 IO slots for additional communications and storage expansion Optical Drive Bay
On System Management Processor	HP iLO (Firmware: HP iLO 4) NOTE: For more information, visit: http://www.hp.com/go/ilo.
Memory Protection	Advanced memory protection Lockstep Mode

Memory
One of the following depending on Model

Type	HP SmartMemory PC3-10600R Registered DDR3 (1333MHz)
DIMM Slots Available	24 DIMM slots
Standard (Entry Models)	4 GB (1 x 4 GB) RDIMM
Standard (Base Models)	8 GB (2 x 4 GB) RDIMM
Standard (Performance / Energy Star Models)	16 GB (4 x 4 GB) RDIMM
Maximum (RDIMM)	384 GB (24 x 16 GB)
Maximum (UDIMM)	128 GB (16 x 8 GB)

NOTE: HP memory from previous generation servers are not qualified or warranted with this HP ProLiant Server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/14225_div/14225_div.html
NOTE: LRDIMM, RDIMM and UDIMMs are all distinct memory technologies and cannot be mixed within

a server. The majority of ProLiant Gen8 servers support RDIMM, UDIMM and LRDIMM.
NOTE: If only one processor is installed, only 12 DIMM slots are available. When populating with two processors 24 DIMM slots are available. For maximum speed on some memory options on 16 DIMM slots may be populated.
NOTE: Depending on the memory configuration and processor model, the memory speed may run at 1600MHz, 1333MHz, or 1066MHz. Please see Memory Population Table or the Online Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator.

Network Controller

HP NC361i Integrated Dual Port Gigabit Server Adapter

Expansion Slots #	Technology	Bus Width	Connector Width*	Form Factor	Notes
1	PCIe 3.0	X16	x16	Half length, full height or Full length, full height	
2	PCIe 3.0	X8	x8	Low Profile	Internal only

NOTE: *Indicates the number of physical electrical lanes running to the connector.

NOTE: In order to access expansion slot #2 (the low profile internal only slot), expansion slot #1 may only be populated with a half length, full height form factor card. If full length card is installed on the slot #1, low profile internal only slot will be inaccessible.

HP Server ROM

HP ROM (Read Only Memory) is now digitally signed using HP's Corporate Signing Service. This signature is verified before the flash process starts, reducing accidental programming and preventing malicious efforts to corrupt system ROM.

HP ROM provides for essential initialization and validation of hardware components before control is passed to the customer-installed operating system. The ROM also provides the capability of booting from various fixed media (HDD, CD-ROM) and removable media (USB), to continue operation to the operating system.
HP ROM performs very early configuration of the video controller, to allow monitoring of initialization progress via an attached monitor. If configuration or hardware errors are discovered during this early phase of hardware initialization, suitable messages are now displayed on the connected monitor. Additionally, these configuration or hardware errors are logged to the Integrated Management Log (IML) to assist in diagnosis.
HP's ProLiant ROM is used to configure the following:

- Processor and chipset status registers
- System memory, memory map, and memory initialization
- System hardware configuration (Integrated PCI devices and optional PCIe cards).
- Customer-specific BIOS configuration (using the HP ROM-Based Setup Utility (RBSU).

NOTE: For further information, please refer to HP's RBSU (ROM based setup utility) user guide: http://www.hp.com/support/rbsu.

Standard Features

Storage Controller One of the following depending on Model	Entry Models	Embedded SATA controller
	Base Models	Embedded SATA controller
	Performance Models	HP Smart Array P420/1GB FBWC controller

NOTE: Available upgrades: 2GB FBWC for P420 Controller/ 1GB FBWC controller
NOTE: Embedded SATA controller supports up to 3Gb/s speed in HP ProLiant DL160 Gen8. HP Smart Array controller is required to achieve 6Gb/s.
NOTE: HP Smart Array controller is required for RAID capabilities. Embedded SATA controller does not support RAID.

Internal Storage Devices	Diskette Drives	Via USB only
	Optical Drives	Optional SATA 9.5mm DVD-ROM Optical Drive
		Optional SATA 9.5mm DVD RW Optical Drive
	Drive Bays One of the following depending on Model	Up to 4 Hot plug SAS/SATA 3.5" drives
		Up to 8 Hot plug SAS/SATA 2.5" drives

Maximum Internal Storage One of the following depending on Model	Hot Plug LFF SATA	12.0TB	4 x 3TB
	Hot Plug LFF SATA SSD	1.6TB	4 x 400GB
	Hot Plug LFF SAS	12.0TB	4 x 3TB
	Hot Plug SFF SATA	8.0TB	8 x 1TB
	Hot Plug SFF SATA SSD	3.2TB	8 x 400GB
	Hot Plug SFF SAS	8.0TB	8 x 1TB
	Hot Plug SAS SSD	6.4TB	8 x 800GB

Interfaces	Network RJ-45(Ethernet)	2 NIC ports, 1 dedicated iLO port
	Serial	1 (Rear)
	Pointing Device (Mouse)	0 (via USB only)
	Graphics	2 VGA ports(1 rear, 1 front)
	Keyboard	0 (via USB only)
	USB 2.0 Ports	7 (two front, one internal, four rear)

NOTE: In order to use internal USB port, the internal USB Cable Gen8 Kit (P/N: 662961-B21) is required. Please note that this is a Factory installable Only (FIO) option and cannot be bought standalone.
NOTE: Front Video Graphic Adapter Kit (PN 655915-B21) is required for enabling front VGA port.

Standard Features

Industry Standard Compliance	ACPI 2.0 Compliant PCIe 3.0 Compliant PXE Support WOL Support Microsoft® Logo certifications IPMI 2.0, SMASH CLP, DCMI 1.0 compliant USB 2.0 Support
Server Power Cords	One 6' Highline (IEC-IEC) power cord ships standard NOTE: HP ProLiant DL servers no longer ship standard with a 12-foot NEMA 5-15P to C13 power cords that allow connection to 110V US wall outlets in a home or office. HP ProLiant DL servers are primarily connected to PDU's in data center racks and now ship standard with only a PDU 6-foot C-14 to C13 power cord (142258-001). If a user wishes to power a ProLiant DL server using a110V receptacle (NEMA-15), the 12-foot NEMA 5-15 to C13 power cord. If customers require a local power cord, they can check the power cord matrix for the appropriate cord. Please see the following power cord matrix: http://www.hp.com/go/powercordmatrix.
Power Specifications	To review typical system power ratings, use the HP Power Advisor tool available at URL: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor. NOTE: Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_div/14209_div.html
Common Slot Power Supplies	HP's Common Slot (CS) power supplies allow for commonality of power supplies across a wide range of ProLiant and Integrity servers, as well as HP Storage solutions, and are designed to provide the highest power supply efficiency without degrading system performance. HP CS power supplies are tested by the Electric Power Research Institute (EPRI) and certified through the ECOS 80 Plus power supply program. HP CS power supply options provide efficiency ratings of up to 94% and are available in three power output options - 460W, 750W and 1200W - allowing the customer to "right-size" a power supply for their specific server configuration. All HP Common Slot power sources are UL, CE Mark Compliant, hot-plug and support redundant configurations. HP CS Platinum Plus power supplies are required when enabling HP's Intelligent Power Discovery (IPD) solution. IPD is the first technology to create an automated, energy-aware network between IT systems and facilities. This allows your company to reclaim millions of dollars in wasted power capacity and downtime costs across data centers. For more information on HP's IPD solution, go to www.hp.com/go/ipd. NOTE: It is highly recommended that you use the HP Power Advisor in defining the "Right-Size" power supply for your needs. HP Power Advisor can be accessed at: www.hp.com/go/hppoweradvisor. NOTE: The 80 PLUS program is a unique forum that unites electric utilities, the computer industry, and consumers in an effort to bring energy efficient technology solutions to the marketplace. 80 Plus independently tests power supply efficiency and publicly posts the results on 80Plus.org. NOTE: Common Slot power supplies require a new power backplane kit (p/n: 662959-B21) for installation. The Common Slot power supply and power backplane kits must be factory installed - neither should be bought as a standalone option for HP ProLiant DL160 Gen8.

Standard Features

NOTE: 10GbE FlexibleLOM mandatorily need common slot power supply and are not supported with 500W M/O power supply. These FlexibleLOM require Aux power connector that comes with the common slot power supply. Please see the options section for specific details.

NOTE: Since DL160 Gen8 only has only one power supply slot, above mentioned power supplies will not be Hot Plug in case of DL160 Gen8.

NOTE: Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_div/14209_div.html

System Fans One of the following depending on Model	5 non-hot plug redundant fans ship standard in 1P models 7 non-hot plug redundant fans ship standard in 2P models NOTE: The processor option kit contains two additional fan modules when upgrading from one processor to two processor models.
Required Cabling	For required cabling information, refer to the Web site at: www.hp.com/servers/dl160 Gen8
Operating Systems and Virtualization Software Support for ProLiant Servers	Microsoft Windows Server Oracle Solaris Red Hat Enterprise Linux (RHEL) SUSE Linux Enterprise Server (SLES) VMware NOTE: For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: http://www.hp.com/go/ossupport
Graphics	Integrated Matrox G200 video standard • 1280 x 1024 (32 bpp) • 1920 x 1200 (16 bpp) NOTE: For more information, visit: http://www.hp.com/go/ilo
Form Factor One of the following depending on Model	Rack (1U), (1.75 in/4.45 cm) 8 SFF Models 1.7" (43.2mm) Height x 17.1" (434.6mm) Width x 27.5" (699mm) Length 4 LFF Models 1.7" (43.18mm) Height x 17.11" (434.6mm) Width x 29.5" (750mm) Length

Standard Features

On System Management	HP iLO Management Engine	HP iLO Management Engine is a complete set of embedded management features supporting the complete lifecycle of the server, from initial deployment, through ongoing management, to service alerting and remote support. HP iLO Management Engine comes standard on all HP ProLiant Gen8 Servers. HP iLO Management Engine portfolio includes: • HP iLO: The HP iLO management processor is the core foundation for HP iLO Management Engine. HP iLO for HP ProLiant servers simplify server setup, engage health monitoring and power and thermal control, and promote remote administration for HP ProLiant ML, DL, BL and SL servers. Furthermore with the new HP iLO is the ability to access, deploy, and manage your server anytime from anywhere with your Smartphone device. • HP Agentless Management: With HP iLO Management Engine in every HP ProLiant Gen8 server, the base hardware monitoring and alerting capability is built into the system (running on the HP iLO chipset) and starts working the moment that a power cord and an Ethernet cable is connected to the server. • HP Active Health System: HP Active Health System is an essential component of the HP iLO Management Engine. It provides: Diagnostics tools/scanners wrapped into one; Always on, continuous monitoring for increased stability and shorter downtimes; Rich configuration history; Health and service alerts; Easy export and upload to Service and Support. • HP Active Health System: HP Active Health System is an essential component of the HP iLO Management Engine. It provides customers with: Diagnostics tools/scanners wrapped into one; Always on, continuous monitoring for increased stability and shorter downtimes; Rich configuration history; Health and service alerts; Easy export and upload to Service and Support. • HP Intelligent Provisioning: (previously known as SmartStart): HP Intelligent Provisioning offers the ability for out-of-the box single-server deployment and configuration without the need for media. NOTE: For more information, visit: http://www.hp.com/go/ilo

Standard Features

HP Insight management software	HP Service Pack for ProLiant (SPP)	HP Service Pack for ProLiant (SPP) and HP Smart Update Manager (HP SUM) version 5 provide a new, comprehensive approach to firmware and system software maintenance. Together they provide better operating stability and ensure maximum uptime. The SPP will be updated at a predictable cadence, typically coinciding with new HP server hardware launches. By enabling all firmware to be updated online and integrating firmware and system software updates in one operation HP SUM and the SPP offer faster updates of individual servers and dramatically faster updates of entire BladeSystem enclosures. Further improving system uptime and stability is the fact that HP provides 12 months of support on each Service Pack for ProLiant. The user experience around HP SUM and the SPP has been improved in several ways, starting with the web download. A single web page provides access to a single download containing both the latest version of HP SUM version 5 and the latest SPP. Optional smaller subsets with only specific types of servers or specific operating systems are offered to save on download time. The HP SUM application has been re-written to provide a more straightforward, intuitive user interface that guides the user through the steps of discovery, analyses and update, providing comprehensive information on available updates, criticality and interdependencies. This information is also available in reports. By providing the option of multiple local or shared repositories which can be easily updated from hp.com, HP SUM provides the tools to optimize stability and consistency throughout the company. While HP SUM and the SPP will recommend the combinations of firmware and system software that HP has found to be the best practice, the application gives customers the flexibility to set their own specific baseline. The Service Pack for ProLiant has been rigorously tested with specific attention for interaction between firmware, drivers and agents both within the server as well as in interaction with the BladeSystem enclosure components (Onboard Administrator and Virtual Connect). This testing ensures the highest quality as well as providing the input for HP SUM to deploy updates taking into account all interdepencies, when determining the correct updates and order of update deployment. NOTE: The Service Pack for ProLiant (which includes HP SUM 5) can be downloaded from www.hp.com/go/spp/download. More information can be found: www.hp.com/go/spp and http://www.hp.com/go/hpsum
Security	Power-on password Setup password Diskette boot control Secure Sockets Layer (SSL) Secure Shell (SSH)	

Standard Features

Warranty	This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and parts replacement is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details. NOTE: Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support (3-1-1 warranty in APJ). Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html.

Optional Features

HP Insight management software	HP Insight Control	HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. Two versions of Insight Control are available, to serve environments requiring either a Linux-based or a Windows-based central management server: HP Insight Control for Linux, and HP Insight Control. See www.hp.com/go/insightcontrol. HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit: http://www.hp.com/services/insight.
	HP Matrix Operating Environment	The HP Matrix Operating Environment (Matrix OE) for ProLiant and Integrity servers is an integrated command center that helps you instantly adjust to dynamic business demands. This advanced infrastructure management software lets you reduce the cost of common data center tasks by up to 40 percent while keeping pace with your changing business. The HP Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HP CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS). NOTE: For more information, visit: http://www.hp.com/go/matrixoe
	HP iLO Advanced License for ProLiant Servers	HP iLO management processors for HP ProLiant Gen8 servers virtualizes system controls to help simplify server setup, engage health monitoring and power and thermal control, and promote remote administration. HP iLO functions out-of-the-box without additional software installation and functions regardless of the servers' state of operation. Basic system board management functions, diagnostics, and essential Lights-Out functionality ships standard across all HP ProLiant Gen8 rack, tower and blade servers. The HP iLO can be accessed from any location via a web browser and works hand-in-hand with HP Systems Insight Manager, Insight Control, and HP Matrix Operating Environment, helping customers unleash the value of the ProLiant platform and deliver the highest possible quality of IT service to the business. Advanced functionality, such as graphical remote console, multi-user collaboration, and video record/playback can be activated with the optional HP iLO Advanced or HP iLO Advanced for BladeSystem licenses. The Advanced licensed features offer sophisticated remote administration of servers in dynamic data center and remote locations and can help significantly reduce cost associated with IT-related travel and unplanned downtime. NOTE: For more information, visit: http://www.hp.com/go/ilo

Optional Features

High Performance Clusters	HP Cluster Platforms	HP Cluster Platforms are specifically engineered, factory-integrated large-scale ProLiant clusters optimized for High Performance Computing, with a choice of servers, networks and software. Operating system options include specially priced offerings for Red Hat Enterprise Linux and SUSE Linux Enterprise Server, as well as Microsoft Windows HPC Server. A Cluster Platform Configurator simplifies ordering. http://www.hp.com/go/clusters
	HP HPC Interconnects	High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools. http://www.hp.com/techservers/clusters/ucp/index.html
	HP Insight Cluster Management Utility	HP Insight Cluster Management Utility (CMU) is an HP-licensed and HP-supported suite of tools that are used for lifecycle management of hyperscale clusters of Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective. http://www.hp.com/go/cmu
	HP HPC Linux Value Pack	HP HPC Linux Value Pack (Value Pack) is an HP-licensed and HP-supported option to HP Insight CMU, for the development and deployment of applications on HPC Cluster Platforms. Value Pack includes the Platform LSF workload scheduler and Platform Application Center, as well as the HP-MPI parallelization library. HP HPC Linux Value Pack

HP Insight Online	HP Insight Online is a new addition to the HP Support Center for one stop, secure access to product and HP support information personalized to your IT environment. Insight Online can automatically display devices remotely monitored by HP Insight Remote Support. With Insight Online's easy navigation you can efficiently track your IT support contracts and device status from anywhere and at anytime. www.hp.com/go/insightonline
Factory Express Portfolio for Servers and Storage	HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed. Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches. For more information on Factory Express services for your specific server model please contact your sales representative or go to: http://www.hp.com/go/factory-express.
HP Enterprise Configurator	The HP eConfigure Enterprise Configurator now provides factory default racking for our HP hardware portfolio. This approach is aligned with our strategic direction to meet the needs and expectations of our valued customers. If you require "custom" rack configuration, please contact HP's Customer Business Center or an Authorized Partner for assistance. http://www.hp.com/products/configurator.

Service and Support

HP Technology Services for Industry Standard Servers and BladeSystem
Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.

What HP ProLiant and BladeSystem Services can do for you
HP ProLiant and BladeSystem Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. This way, HP proposes services solutions that include more than just uplift of base warranty. Foundation Care services portfolio consists of scalable, reactive support services for HP industry-standard servers and software. New to this portfolio is HP Collaborative Support. If you are running business critical environments, HP offers Proactive Care. These services help deliver high levels of application availability through proactive service management and advanced technical response.

You can get the support you need by choosing from one of a number of service packaged solutions we have designed to address wider set of customer support needs.

HP Technology Services meets business challenges with services offered in three support recommendations - **Optimized Care, Standard Care, and Basic Care** - available for each product group. Such support solutions enable customers to optimize technology operations, minimize risk and drive better business outcomes with easy-to-buy, easy-to-use scalable support recommendations for servers, storage, networking and software.

All three service recommendations include support services from the broader portfolio of Foundation Care and Proactive Care services.

Optimized Care Package

Supports maintaining servers at optimum performance availability

HP ProLiant Server Hardware Installation
Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner
http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf

3-Year HP 24x7 4 hour Response, Proactive Care
Helps optimize your systems and delivers high levels of application availability through proactive service management and advanced technical response. A skilled Technical Manager will own your query or issue end to end until resolved, delivering a single point of contact for you.

Additional Services: Software OS (Microsoft, Linux (SUSE/Red Hat)) Installation and Start Up and Software Support plus Microsoft or Linux education courses +30 Proactive Select Credits, Factory Express.

Service and Support

Standard Care Package	Support recommendation that maintains high level of server availability HP ProLiant Server Hardware Installation Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner. http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf 3-Year HP 24x7 4 hour Response, Collaborative Support Provides problem resolution support across the stack of HW, firmware, and HP and 3rd party SW. In case the issue is with 3rd party SW, HP does known issue resolution. If HP cannot solve the issue, it will contact the third-party vendor and create a problem incident on your behalf. http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-8232ENW.pdf Additional Services: Software support service with 24X7 availability with a 2 hour response, Training courses on Microsoft, Linux (Red Hat and SUSE), VMware, and HP Insight Software, +60 Proactive Select Credits, Factory Express. http://www8.hp.com/us/en/business-services/it-ervices.html?compURI=1078865
Basic Care Package	Delivers minimum recommended support service level HP ProLiant Server Hardware Installation Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner. http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf 3-Year HP 24x7 4 hour Response, Hardware Support Onsite Service Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE.pdf Additional Services: Software OS (Microsoft, Linux (SUSE/Red Hat)) Installation and Start Up and Software Support, Factory Express.
Insight Remote Support	Provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. Learn more http://www.hp.com/go/insightremotesupport
HP Support Center	Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc HP's Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement. *HP' Support Center Mobile App is subject to local availability.

Service and Support

Warranty / Service Coverage	For ProLiant servers and storage systems, the services cover HP-branded hardware options qualified for the server, purchased at the same time or afterward, internal to the enclosure, as well as external monitors up to 22" and tower UPS products; these items will be covered at the same service level and for the same coverage period as the server unless the maximum supported lifetime and/or the maximum usage limitation has been exceeded. Coverage of the UPS battery is not included; standard warranty terms and conditions apply. The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction. It does not apply to any exchange of Disk or SSD/Flash Drives that have not failed. SSD/Flash Drives that are specified by HP as consumable parts and/or that have exceeded maximum supported lifetime and/or the maximum usage limit as set forth in the manufacturer's operating manual or the technical data sheet are not eligible for the defective media retention service feature option.
For more information	To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: http://www.hp.com/services/proliant

Pre-configured Models

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.
NOTE: Not all models are available in all regions. Check with your local country HP offices for availability.
NOTE: Pre-configured models ship with the configurations below. Options can be selected from the Core or Additional options section of this QuickSpecs.
NOTE: HP does not allow factory integration of options into pre-configured models. Any additional options purchased will be shipped separately.
NOTE: If you desire a custom configuration please see "Configuration Information - Factory Integrated Models" section of this QuickSpecs.
NOTE: Not all models are available in all regions. Check with your local country HP offices for availability.

Entry Model

HP ProLiant DL160 Gen8 E5-2603 1.80GHz 4-core 1P 4GB-R SATA 4 LFF 500W PS Entry US Server 662082-xx1	Processor(s)	(1) Intel® Xeon® E5-2603 (1.8GHz/4-core/10MB/6.4GT-s QPI/80W)
	Cache Memory	10MB (1 x 10MB) L3 cache
	Memory	4GB (1 x 4GB DDR3-1333MHz RDIMMs) NOTE: Total of 24 DIMM slots
	Network Controller	HP NC361i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	Embedded SATA controller
	Hard Drive	None ship standard
	Internal Storage	Up to 4 large form factor drives
	Optical Drive	(1) (Optional: DVD-ROM, DVD-RW)
	Power Supply	500W Platinum FIO Power Supply with Backplane (ships standard)
	Fans	(5) Non hot plug redundant fans
	Management	iLO Management Engine Standard Optional: HP Insight Control
	Form Factor	1U
	Warranty	Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support (3-1-1 warranty in APJ)

Base Model

HP ProLiant DL160 Gen8 E5-2620 2.0GHz 6-core 1P 8GB-R SATA 4 LFF 500W PS Base US Server 662083-xx1	Processor(s)	(1) Intel® Xeon® E5-2620 (2.0GHz/6-core/15MB/7.2GT-s QPI/95W, DDR3-1333, HT, Turbo2- 3/3/4/4/5/5) processor
	Cache Memory	15MB (1 x 15MB) L3 cache
	Memory	8GB (2x4GB DDR3-1333MHz RDIMMs NOTE: Total of 24 DIMM slots
	Network Controller	HP NC361i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	Embedded SATA controller
	Hard Drive	None ship standard
	Internal Storage	Up to 4 large form factor drives
	Optical Drive	(1) (Optional: DVD-ROM, DVD-RW)
	Power Supply	500W Platinum FIO Power Supply with Backplane (ships standard)
	Fans	(5) Non hot plug redundant fans
	Management	iLO Management Engine Standard Optional: HP Insight Control

Pre-configured Models

	Form Factor	1U
	Warranty	Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support (3-1-1 warranty in APJ)

Energy Star- Performance Model

HP ProLiant DL160 Gen8 E5-2640 2.50GHz 6-core 2P 16GB-R P420 Hot Plug 8 SFF 500W PS Perf US Svr 662084-xx1	Processor(s)	(2) Intel® Xeon® E5-2640 (2.5GHz/6-core/15MB/7.2GT-s QPI/95W, DDR3-1333, HT, Turbo2- 3/3/4/4/5/5) processor
	Cache Memory	15MB (1 x 15MB) L3 cache
	Memory	16GB (4x 4GB DDR3-1333MHz RDIMMs) NOTE: Total of 24 DIMM slots
	Network Controller	HP NC361i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array P420/ 1G FBWC controller
	Hard Drive	None ship standard
	Internal Storage	Up to 8 small form factor drives
	Optical Drive	(1) (Optional: DVD-ROM, DVD-RW)
	Power Supply	500W Platinum FIO Power Supply with Backplane (ships standard)
	Fans	(7) Non hot plug redundant fans
	Management	iLO Management Engine Standard Optional: HP Insight Control
	Form Factor	1U
	Warranty	Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support (3-1-1 warranty in APJ)

Country Code Key	xx=00	U.S.
	xx=29	Japan
	xx=37	APD
	xx=42	Euro
	xx=AA	PRC

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on configurable product offerings and requirements.
NOTE: Configure-to-order (CTO) servers must start with a CTO Chassis.
NOTE: FIO indicates that this option is only available as a factory installable option.

Step 1: Base Configuration (choose one of the following configurable models)

HP Models

HP ProLiant DL160 Gen8 SFF Configure-to-order Server 666281-B21

Factory Integrated Model ships with:

HP NC361i Integrated Dual Port Gigabit Server Adapter
Drive cage: Eight small form factor
I/O Slots- Two std

- (1) FH/HL x16 PCIe 3.0
- (1)low profile x8 PCIe 3.0

(1)FlexibleLOM slot for networking upgrade
(24) DIMM slots for DIMMs installation
Embedded SATA controller
(5) Non-hot plug redundant fans
(7) USB ports-4 rear, 2 front, 1 internal
On System Server Management Processor - HP iLO 4 (embedded)
Rack (1U), (1.75 in / 4.45 cm)
Power supply not included- Please choose from the power supply option section in Step 2 below.

HP ProLiant DL160 Gen8 LFF Configure-to-order Server 666282-B21

Factory Integrated Model ships with:

HP NC361i Integrated Dual Port Gigabit Server Adapter
Drive cage: Four large form factor
I/O Slots- Two std

- (1) FH/HL x16 PCIe 3.0
- (1)low profile x8 PCIe 3.0

(1)FlexibleLOM slot for networking upgrade
(24) DIMM slots for DIMMs installation
Embedded SATA controller
(5) Non-hot plug redundant fans
(7) USB ports-4 rear, 2 front, 1 internal
On System Server Management Processor - HP iLO 4 (embedded)
Rack (1U), (1.75 in / 4.45 cm)
Power supply not included- Please choose from the power supply option section in Step 2 below.

Step 2: Choose Required Options (only one of the following from each list unless otherwise noted)

HP Processors

NOTE: If 2 processors are desired, select one xxxxxx-L21 and one xxxxxx-B21.

Eight-Core Processors	
HP DL160 Gen8 Intel® Xeon® E5-2680 (2.70GHz/8-core/20MB/130W) FIO Processor Kit	662933-L21
HP DL160 Gen8 Intel® Xeon® E5-2670 (2.60GHz/8-core/20MB/115W) FIO Processor Kit	662932-L21
HP DL160 Gen8 Intel® Xeon® E5-2665 (2.40GHz/8-core/20MB/115W) FIO Processor Kit	662925-L21
HP DL160 Gen8 Intel® Xeon® E5-2660 (2.20GHz/8-core/20MB/95W) FIO Processor Kit	662924-L21
HP DL160 Gen8 Intel® Xeon® E5-2650 (2.0GHz/8-core/20MB/95W) FIO Processor Kit	662931-L21
HP DL160 Gen8 Intel® Xeon® E5-2650L (1.80GHz/8-core/20MB/70W) FIO Processor Kit	668863-L21
Six-Core Processors	
HP DL160 Gen8 Intel® Xeon® E5-2667 (2.90GHz/6-core/15MB/130W) FIO Processor Kit	662927-L21
HP DL160 Gen8 Intel® Xeon® E5-2640 (2.50GHz/6-core/15MB/95W) FIO Processor Kit	662930-L21
HP DL160 Gen8 Intel® Xeon® E5-2630 (2.30GHz/6-core/15MB/95W) FIO Processor Kit	662929-L21
HP DL160 Gen8 Intel® Xeon® E5-2620 (2.0GHz/6-core/15MB/95W) FIO Processor Kit	662928-L21
HP DL160 Gen8 Intel® Xeon® E5-2630L (2.0GHz/6-core/15MB/60W) FIO Processor Kit	662921-L21
Quad-Core Processors	
HP DL160 Gen8 Intel® Xeon® E5-2609 (2.40GHz/4-core/10MB/80W) FIO Processor Kit	662923-L21
HP DL160 Gen8 Intel® Xeon® E5-2603 (1.80GHz/4-core/10MB/80W) FIO Processor Kit	662922-L21
Dual-Core Processors	
HP DL160 Gen8 Intel® Xeon® E5-2637 (3.0GHz/2-core/15MB/80W) FIO Processor Kit	662926-L21

NOTE: Up to 2 processors supported. Energy Star - Performance Model and Energy Star Certified configurations include two processors with 7 Non-hot Plug Redundant fans. Not all options are energy star qualified.

NOTE: For the Intel® C600 Chipset E5-2600 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 2600x v#, 2 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, x = L for low power SKUs and v# (not yet designated) = version number.

Configuration Information - Factory Integrated Models

HP Memory

NOTE: HP memory from previous generation servers are not qualified or warranted with this HP ProLiant Server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_div/14225_div.html
NOTE: LRDIMM, RDIMM and UDIMMs are all distinct memory technologies and cannot be mixed within a server. The majority of ProLiant Gen8 servers support RDIMM, UDIMM and LRDIMM.

Registered DIMMs (RDIMMs)

HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647901-B21
HP 8GB (1x8GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647899-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647897-B21
HP 4GB (1x4GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647895-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21

Unbuffered with ECC DIMMs (UDIMMs)

HP 8GB (1x8GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647909-B21
HP 4GB (1x4GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647907-B21
HP 2GB (1x2GB) Single Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647905-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.
NOTE: Depending on the memory configuration and processor model, 1600MHz and 1333MHz memory may operate at a lower speed. Please see the see the "Memory" section later in this document and the Online Memory Configuration Tool for details at www.hp.com/go/ddr3memory-configurator.
NOTE: For additional memory rules and guidelines, see the "Memory" section later in this document.
NOTE: For more information on ProLiant Energy Efficient Features, see: www.hp.com/go/proliant-energy-efficient.
NOTE: PC3L is a low voltage memory.
NOTE: Intel E5-2620 processor does not support LV DIMMs running at 1.35V. The HP RBSU can be changed to run at 1.5V.
NOTE: Not all Intel E5 processor series support 1600MHz or 1333MHz speeds. Memory speed is a function of the processor QPI speed.

HP Power Supplies

NOTE: Prior to making a power supply selection it is highly recommended that the HP Power Advisor is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at: www.hp.com/go/hppoweradvisor.

Power Supplies

HP 500W Platinum Factory Integrated Power Supply Kit with Backplane	656365-B21
HP 750W Common Slot Platinum Plus Hot Plug Power Supply Kit NOTE: Requires Power Backplane kit (p/n: 662959-B21).	656363-B21
HP 460W Common Slot Platinum Plus Hot Plug Power Supply Kit NOTE: Requires Power Backplane kit (p/n: 662959-B21).	656362-B21

Enablement Kit

HP DL160 Gen8 FIO Power Backplane Kit NOTE: When configuring the HP ProLiant DL160 Gen8 with a Common Slot power supply, the HP Power Backplane DL160 Gen8 FIO Kit (PN 662959-B21) must be used for proper installation. The Common Slot power supply and power backplane kit for the DL160 Gen8 must be factory installed and cannot be purchased as separate options.	662959-B21

NOTE: Common Slot power supply is mandatory with 10Gigabit FlexibleLOM.
NOTE: Power Specification and Technical Content for supported power supplies can be found at:
http://h18000.www1.hp.com/products/quickspecs/14209_div/14209_div.html

---

HP Storage Controllers

SAS Controllers

NOTE: One Smart Array Controller is only required when purchasing SFF CTO Chassis Model (P/N 666281-B21) in Step 1.
NOTE: Embedded SATA controller supports up to 3Gb/s speed in HP ProLiant DL160 Gen8. HP Smart Array controller is required to achieve 6Gb/s.
NOTE: HP Smart Array controller is required for RAID capabilities. Embedded SATA controller does not support RAID.
NOTE: The below storage controllers are intended for use with internal drives in the SFF CTO Chassis Model (P/N 666281-B21).
NOTE: To use the internal only PCI-e slot when purchasing the SFF CTO Chassis, a HP Smart Array P420 controller must be selected.
NOTE: HP Smart Array P420 controller can only be installed in the internal PCIe slot. It is not supported on external PCIe slot.
NOTE: When using FL/FH graphic card, there is no space for any storage controller in DL160 Gen8.

HP Smart Array P420/1GB FBWC 6Gb 2-ports Int SAS Controller	631670-B21
HP Smart Array P420/2GB FBWC 6Gb 2-ports Int SAS Controller	631671-B21

Step 3: Choose Additional Factory Integratable Options

HP Insight Software	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Single Server FIO License	582765-B21
	HP Insight Control for Linux including 1yr 24x7 Support ML/DL Bundle 1 Server FIO License	TC203A
HP USB and SD Options	HP Internal USB Gen8 FIO Kit NOTE: Required to enable the internal USB port.	662961-B21
HP Rack Options	HP 1U Friction Gen8 Rail FIO Kit	663200-B21

Step 4: Choose Additional Options for Factory Integration

NOTE: For additional "Core Options" and "Additional Options", please refer to the "Options" section below.

NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Unique Options	HP VGA Power Cable DL160Gen8 Kit NOTE: Required with NVIDIA Quadro 4000 graphic card.	662965-B21
	HP DL360Gen8 Front Video Adapter Kit NOTE: Required to enable the front video port.	655915-B21
HP Processors	**Eight-Core Processors**	
	HP DL160 Gen8 Intel® Xeon® E5-2680 (2.70GHz/8-core/20MB/130W) Processor Kit	662933-B21
	HP DL160 Gen8 Intel® Xeon® E5-2670 (2.60GHz/8-core/20MB/115W) Processor Kit	662932-B21
	HP DL160 Gen8 Intel® Xeon® E5-2665 (2.40GHz/8-core/20MB/115W) Processor Kit	662925-B21
	HP DL160 Gen8 Intel® Xeon® E5-2660 (2.20GHz/8-core/20MB/95W) Processor Kit	662924-B21
	HP DL160 Gen8 Intel® Xeon® E5-2650 (2.0GHz/8-core/20MB/95W) Processor Kit	662931-B21
	HP DL160 Gen8 Intel® Xeon® E5-2650L (1.80GHz/8-core/20MB/70W) Processor Kit	668863-B21
	Six-Core Processors	
	HP DL160 Gen8 Intel® Xeon® E5-2667 (2.90GHz/6-core/15MB/130W) Processor Kit	662927-B21
	HP DL160 Gen8 Intel® Xeon® E5-2640 (2.50GHz/6-core/15MB/95W) Processor Kit	662930-B21
	HP DL160 Gen8 Intel® Xeon® E5-2630 (2.30GHz/6-core/15MB/95W) Processor Kit	662929-B21
	HP DL160 Gen8 Intel® Xeon® E5-2620 (2.0GHz/6-core/15MB/95W) Processor Kit	662928-B21
	HP DL160 Gen8 Intel® Xeon® E5-2630L (2.0GHz/6-core/15MB/60W) Processor Kit	662921-B21
	Quad-Core Processors	
	HP DL160 Gen8 Intel® Xeon® E5-2609 (2.40GHz/4-core/10MB/80W) Processor Kit	662923-B21
	HP DL160 Gen8 Intel® Xeon® E5-2603 (1.80GHz/4-core/10MB/80W) Processor Kit	662922-B21
	Dual Core Processors	
	HP DL160 Gen8 Intel® Xeon® E5-2637 (3.0GHz/2-core/15MB/80W) Processor Kit	662926-B21
	NOTE: Up to 2 processors supported. Energy Star - High Performance Model and Energy Star Certified configurations include two processors with 7 non- Hot Plug Redundant fans. NOTE: For the Intel® C600 Chipset E5-2600 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 2600x v#, 2 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, x = L for low power SKUs and v# (not yet designated) = version number. NOTE: Every processor option kit has twelve DIMM blanks. These DIMM blanks are required to be installed in all the empty DIMM slots of the installed processors.	

HP Memory

NOTE: HP memory from previous generation servers are not qualified or warranted with this HP ProLiant Server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_div/14225_div.html.
NOTE: LRDIMM, RDIMM and UDIMMs are all distinct memory technologies and cannot be mixed within a server. The majority of ProLiant Gen8 servers support RDIMM, UDIMM and LRDIMM.

Registered DIMMs (RDIMMs)

HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647901-B21
HP 8GB (1x8GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647899-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647897-B21
HP 4GB (1x4GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647895-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21

Unbuffered with ECC DIMMs (UDIMMs)

HP 2GB (1x2GB) Single Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647905-B21
HP 4GB (1x4GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647907-B21
HP 8GB (1x8GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647909-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.
NOTE: Depending on the memory configuration and processor model, 1600MHz and 1333MHz memory may operate at a lower speed. Please see the see the "Memory" section later in this document and the Online Memory Configuration Tool for details at www.hp.com/go/ddr3memory-configurator.
NOTE: For additional memory rules and guidelines, see the "Memory" section later in this document.
NOTE: For more information on ProLiant Energy Efficient Features, see: www.hp.com/go/proliant-energy-efficient
NOTE: PC3L is a low voltage memory.
NOTE: Intel E5-2620 processor does not support LV DIMMs running at 1.35V. The HP RBSU can be changed to run at 1.5V.
NOTE: Not all Intel E5 processor series support 1600MHz or 1333MHz speeds. Memory speed is a function of the processor QPI speed.

Core Options

HP Optical Drives	HP 9.5mm SATA DVD ROM JackBlack Optical Drive	652238-B21
	HP 9.5mm SATA DVD RW JackBlack Optical Drive	652241-B21

HP Hard Drives

NOTE: HP ProLiant Gen8 Smart Storage solutions are equipped with entirely re-designed Small Form Factor (SFF 2.5 in) and Large Form Factor (LFF 3.5 in) hot plug carriers for HP Qualified Hard Drives and Solid State Drives. These new carriers provide status and activity indicators as well as caution indicators for "Do Not Remove".

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SAS Hot Plug Smart Drive LFF (3.5-inch) Enterprise Drives	
HP 600GB 6G SAS 15K rpm LFF (3.5-inch) SC Enterprise 3yr Warranty Hard Drive	652620-B21
HP 450GB 6G SAS 15K rpm LFF (3.5-inch) SC Enterprise 3yr Warranty Hard Drive	652615-B21
SAS Hot Plug Smart Drive LFF (3.5-inch) Midline Drives	
HP 3TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	652766-B21
HP 2TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	652757-B21
HP 1TB 6G SAS 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	652753-B21
SAS Hot Plug Smart Drive SFF (2.5-inch) Enterprise Drives	
HP 900GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652589-B21
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652583-B21
HP 450GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652572-B21
HP 300GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652564-B21
HP 300GB 6G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652611-B21
HP 146GB 6G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652605-B21
HP 72GB 6G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652597-B21
SAS Hot Plug Smart Drive SFF (2.5-inch) Midline Drives	
HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	652749-B21
HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	652745-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/12244_div/12244_div.html

6G SATA Hot Plug with Smart Drive LFF (3.5-inch) Midline (MDL) Drives	
HP 3TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	628061-B21
HP 2TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	658079-B21
HP 1TB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	657750-B21
HP 500GB 6G SATA 7.2K rpm LFF (3.5-inch) SC Midline 1yr Warranty Hard Drive	658071-B21
6G SATA Hot Plug with Smart Drive SFF (2.5-inch) Midline (MDL) Drives	
HP 1TB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655710-B21
HP 500GB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655708-B21

NOTE: Please see QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13021_div/13021_div.html (Worldwide)

6G SAS SLC Hot Plug SFF (2.5-inch) Enterprise Performance Solid State Drives	
HP 400GB 6G SAS SLC SFF (2.5-inch) SC Enterprise Performance 3yr Warranty Solid State Drive	653082-B21
HP 200GB 6G SAS SLC SFF (2.5-inch) SC Enterprise Performance 3yr Warranty Solid State Drive	653078-B21
6G SAS MLC Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives	
HP 800GB 6G SAS MLC SFF (2.5-inch) SC Enterprise Mainstream 3yr Warranty Solid State Drive	653109-B21
HP 400GB 6G SAS MLC SFF (2.5-inch) SC Enterprise Mainstream 3yr Warranty Solid State Drive	653105-B21
HP 200GB 6G SAS MLC SFF (2.5-inch) SC Enterprise Mainstream 3yr Warranty Solid State Drive	658478-B21
3G SATA MLC Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives	
HP 400GB 3G SATA MLC SFF (2.5-inch) SC Enterprise Mainstream 3yr Warranty Solid State Drive	653120-B21
HP 200GB 3G SATA MLC SFF (2.5-inch) SC Enterprise Mainstream 3yr Warranty Solid State Drive	653118-B21
HP 100GB 3G SATA MLC SFF (2.5-inch) SC Enterprise Mainstream 3yr Warranty Solid State Drive	653112-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14038_div/14038_div.html (Worldwide)

Hard Drive Kits	
HP SFF Gen8 Hard Drive Blank Kit	666987-B21
HP LFF Gen8 Hard Drive Blank Kit	666986-B21

Core Options

HP Networking	**Gigabit Ethernet Adapters**	
	HP NC112T PCI Express Gigabit Server Adapter	503746-B21
	HP NC365T 4-port Ethernet Server Adapter	593722-B21
	HP Ethernet 1Gb 4-port 331T Adapter	647594-B21
	10 Gigabit Ethernet Adapters NOTE: No more than two10GbE I/O devices are supported in a single ProLiant server. NOTE: A minimum of two Gigabytes (2 GB) of server memory is required per each adapter. NOTE: Direct Attach Cable (DAC) for copper environments or fiber transceivers and cables for fiber-optic environments must be purchased separately.	
	HP NC523SFP 10Gb 2-port Server Adapter	593717-B21
	HP NC552SFP 10Gb 2-port Ethernet Server Adapter	614203-B21
	FlexibleLOM Adapters	
	HP Ethernet 1Gb 4-port 331FLR Adapter	629135-B21
	HP Ethernet 10Gb 2-port 530FLR-SFP+ Adapter	647581-B21
	HP FlexFabric 10Gb 2-port 554FLR-SFP+ Adapter	629142-B21
	NOTE: HP ProLiant DL160 Gen8 has a dedicated slot for FlexibleLOM. PCIe slots need not be consumed for installing FlexibleLOM. NOTE: Please note that common slot power supply is mandatorily required with 10Gb FlexibleLOM. Common slot power supplies are factory installable only and cannot be bought as standalone option kit in HP ProLiant DL160 Gen8. NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs.	
HP InfiniBand	HP InfiniBand 4X QDR ConnectX-2 PCIe G2 Dual Port HCA	592520-B21
	HP InfiniBand FDR/EN 10/40Gb Dual Port 544QSFP Adapter	649281-B21
	HP InfiniBand FDR/EN 10/40Gb Dual Port 544FLR-QSFP Adapter	649282-B21
	HP InfiniBand QDR/EN 10Gb Dual Port 544FLR-QSFP Adapter	649283-B21
	QLogic InfiniBand 4X QDR PCI-E G2 Dual Port HCA NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/13078_div/13078_div.html	583211-B21
HP Power Supplies	NOTE: Prior to making a power supply selection it is highly recommended that the HP Power Advisor is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at: www.hp.com/go/hppoweradvisor.	
	HP Common Slot Platinum Plus Power Supply Kits NOTE: The following Power Supplies offer 94% Efficiency with Intelligent Power Discovery.	
	HP 460W Common Slot Platinum Plus Hot Plug Power Supply Kit	656362-B21
	HP 750W Common Slot Platinum Plus Hot Plug Power Supply Kit	656363-B21
	NOTE: Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_div/14209_div.html	

NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Insight software	HP Insight Control	
	HP Insight Control including 1yr 24x7 Technical Support and Updates Electronic License	T9074BAE
	HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License	452148-B22
	HP Insight Control ML/DL/BL Bundle E-LTU	TC278AAE
	HP Insight Management Media Kit	436222-B21
	NOTE: HP Insight Management Media Kit contains DVDs without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Matrix Operating Environment, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates.	
	HP Insight Control for Linux	
	HP Insight Control for Linux including 1yr 24x7 Support Electronic License NOTE: This part number can be purchased as a single license or as multiple licenses with a single activation key. Customer will receive a license entitlement certificate via e-mail. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service. NOTE: Electronic LTUs are only available through limited points of sales; if not available, order a printed license entitlement certificate instead.	TC213AAE
	HP Insight Control for Linux including 1yr 24x7 Support Single Server License	TC209A
	HP Insight Control-LX ML/DL/BL Bdl E-LTU	TC203AAE
	HP Insight Control for Linux Media Kit NOTE: This optional Media pack DVD contains the ISO image for HP Insight Control for Linux, HP Systems Insight Manager, HP Insight Control power management, HP Insight Control virtual machine management, and an integrated installer. Servers must be acquired separately. NOTE: This Media pack is optional because the latest ISO image and latest updates may be downloaded at no cost from: http://www.hp.com/go/ic-linux (click on Download button). NOTE: Electronic software is available in all countries except China and Japan. For China and Japan should order the physical equivalent. NOTE: Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service. NOTE: For additional License Kits, including electronic licensing options, please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/13019_div/13019_div.html	TC208A
	HP Insight Control server deployment	
	HP Insight Control Server Deployment including 1yr 24x7 Support Electronic License	T9082AAE
	HP Insight Control Server Deployment including 1yr 24x7 Support Single Server License NOTE: This license allows 1 server to be deployed. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s).	452151-B21

Additional Options

	Includes one year of 24 x 7 HP Software Technical Support Service. NOTE: Electronic software is available in all countries except China and Japan. For China and Japan should order the physical equivalent. NOTE: For additional license kits including electronic delivery options, please see the Insight Rapid Deployment software QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12631_div/12631_div.html	
HP iLO Advanced License	HP iLO Advanced Pack Electronic License with 3yr 24x7 Tech Support and Updates	BD506AAE
	HP iLO Advanced 1 Server License with 3yr 24x7 Tech Support and Updates	BD505A
	HP iLO Advanced including 1yr 24x7 Technical Support and Updates Single Server License NOTE: For more information, visit: http://www.hp.com/go/ilo.	512485-B21
High Performance Clusters	HP Cluster Management Utility	
	HP Insight Cluster Management Utility 1yr 24x7 Flexible License NOTE: This part number can be used to purchase one certificate for multiple licenses with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key.	QL803B
	HP Insight Cluster Management Utility 3yr 24x7 Flexible License NOTE: These part numbers can be used to purchase one certificate for multiple licenses and support with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key. Customer also will receive a support agreement.	BD476A
	HP Insight Cluster Management Utility Media NOTE: Order a minimum of one license per cluster to purchase media including software and documentation, which will be delivered to the customer, and also licenses CMU management. No license key is delivered or required NOTE: For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/12612_div/12612_div.html	BD477A
	HP HPC Linux Value Pack	
	HP High Performance Computing Linux Value Pack 1 Processor Flexible License NOTE: This part number can be used to purchase one certificate for multiple licenses with a single activation key. Each license is for one socket (a.k.a. processor). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key.	TC293B
	HP High Performance Computing Linux Value Pack Media Kit NOTE: This part number can be used to purchase media including software and documentation, which will be delivered to the customer. NOTE: For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/13485_div/13485_div.html	TC294A

Additional Options

HP I/O Accelerator Options	HP 160GB Single Level Cell PCIe ioDrive for ProLiant Servers NOTE: A low-profile PCI bracket is included for use in low-profile slots.	600278-B21
	HP 320GB Multi Level Cell PCIe ioDrive for ProLiant Servers NOTE: A low-profile PCI bracket is included for use in low-profile slots.	600279-B21
	HP 320GB Single Level Cell PCIe ioDrive Duo for ProLiant Servers	600281-B21
	HP 640GB Multi Level Cell PCIe ioDrive Duo for ProLiant Servers	600282-B21
	HP 1.28TB Multi Level Cell PCIe IO Accelerator	641027-B21
	NOTE: When the Full length Graphic card is installed in the system, no additional PCIe slots is available and only embedded storage controller is available for up to 4 SATA HDDs configuration. For SAS Hard Disk Drive support for the accelerators, please refer to HP ProLiant DL160se G6	
	NOTE: For more information on the latest visualization and acceleration qualification status, please see: http://www.hp.com/go/accelerators	
	NOTE: For minimum system memory requirements and additional information, please refer to HP PCIe IO Accelerators for ProLiant Servers QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/13587_div/13587_div.html (Worldwide)	
HP Graphics Options	HP VGA Power Cable DL160Gen8 Kit NOTE: Required with NVIDIA Quadro 4000 graphic card.	662965-B21
	HP DL360Gen8 Front Video Adapter Kit NOTE: Required to enable the front video port.	655915-B21
	NVIDIA Quadro 4000 2GB PCI-E Adapter NOTE: Quadro 4000 is FL/FH graphic card and consumes both internal and external PCI-e slots. It is only supported on LFF models since SFF models need HP Smart Array P420 controller in the internal slot.	655933-B21
HP Security	HP Trusted Platform Module Option	488069-B21
	NOTE: The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline. For more information about TPM, including a white paper, go to: www.hp.com/go/TPM.	
	NOTE: ProLiant OS pre-installed units will come with the partition required for TPM deployment.	
	NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.	
	HP 1U Security Bezel Gen8 Kit	664918-B21
HP Storage Controllers	NOTE: To use the internal only PCI-e slot when purchasing the Hot Plug CTO Chassis (PN 666282-B21), a HP Smart Array P420 controller must be selected.	

SAS Controllers

HP Smart Array P421 Controller

HP Smart Array P421/2GB FBWC 6Gb 2-ports Ext SAS Controller	631674-B21
HP Smart Array P421/1GB FBWC 6Gb 2-ports Ext SAS Controller	631673-B21

HP Smart Array P420 Controller

HP Smart Array P420/2GB FBWC 6Gb 2-ports Int SAS Controller	631671-B21
HP Smart Array P420/1GB FBWC 6Gb 2-ports Int SAS Controller	631670-B21

NOTE: HP Smart Array P420 controller can only be installed in the internal PCI-e slot. It is not supported on external PCI-e slot.
NOTE: HP Smart Array P420 controller is required for SFF models.

Smart Array P222 Controller

HP Smart Array P222/512 FBWC 6Gb 1-port Int/1-port Ext SAS Controller	631667-B21

NOTE: Mini SAS 700mm cable (PN 662963-B21) required with this controller.

NOTE: HP Smart Array P222 controller can only be installed in the external PCI-e slot.

NOTE: HP Smart Array P222 controller is supported on LFF models only.

Optional upgrades

HP 2GB P-series Smart Array Flash Backed Write Cache	631681-B21
HP 1GB P-series Smart Array Flash Backed Write Cache	631679-B21
HP Mini SAS 700mm Gen8 Cable Kit	662963-B21

NOTE: This cable option kit is required with HP Smart Array P222/512 FBWC controller.

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/14229_div/14229_div.html (Smart Array P421 Controller)
http://h18000.www1.hp.com/products/quickspecs/14228_div/14228_div.html (Smart Array P420 Controller)
http://h18000.www1.hp.com/products/quickspecs/14227_div/14227_div.html (Smart Array P222 Controller)

HP Smart Array Advanced Pack

HP Smart Array Advanced Pack 2.0 No Media 1 Server 1yr 24x7 Support Software	BC377A
HP Smart Array Advanced Pack 2.0 No Media Electronic Lic 1yr 24x7 Support Software	BC390AAE

http://h18000.www1.hp.com/products/quickspecs/13200_div/13200_div.html (SAAP)

SCSI HBA

HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21

NOTE: Supports SCSI Tapes only, no RAID support.
NOTE: HBA is recommended for SCSI tape drive support.
NOTE: Please see the following QuickSpecs for Technical Specifications and additional information:
http://h18004.www1.hp.com/products/quickspecs/12566_div/12566_div.html (SC11Xe HBA)

HP H221 Host Bus Adapter	650931-B21

Additional Options

NOTE: This is a 2 x4 External Port HBA.
NOTE: This is only approved for the HP P2000 G3 SAS Modular Smart and tape drives.
NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18004.www1.hp.com/products/quickspecs/14222_div/14222_div.html

HP Backup & Recovery Software	Data Protector Express	
	HP Data Protector Express V6.0 for 1 Server E-LTU	TC330BAE
	HP Data Protector Express V6.0 for 3 Server E-LTU	TC331BAE
	HP Data Protector Express V6.0 for 10 Server E-LTU	TC332BAE
	HP Basic Upgrade to Data Protector Express V6 for 1 Server E-LTU	TC333BAE
	NOTE: Only one of these Data Protector Express base products is required. To see available options: http://www.hp.com/go/dataprotectorexpress	
HP Tape Backup	NOTE: For the complete range of tape drives, autoloaders, libraries and media see: http://www.hp.com/go/tape. For hardware and software compatibility of HP tape backup products see: http://www.hp.com/storage/SPOCK	
	NOTE: Connection using the HP P222 SAS Smart Array Controller (631667-B21) recommended.	
	Tape Drives	
	HP DAT 160 SAS Internal Tape Drive	Q1587A
	NOTE: For installation into 1U SAS Rack-Mount Kit (AE459B) or 3U SAS Rack-Mount Kit (AG576B). No peripheral bay available for installation into the server.	
	HP Ultrium 448 SAS Internal Drive	DW085A
	NOTE: Mounts inside the 1U SAS Rack-Mount Kit (AE459A).	
	HP Ultrium 920 SAS Internal Tape Drive	EH847A
	NOTE: Mounts inside the 1U SAS Rack-Mount Kit (AE459A).	
	Tape Autoloader	
	HP 1/8 G2 Ultrium 920 SAS Autoloader	AH558A
	NOTE: Requires HP 1U Tape Autoloader Rack-Mount Kit (AH166A) for rack installation.	
	Tape Library	
	HP MSL2024 Ultrium 920 SAS Tape Library	AH559A
	HP MSL2024 1 LTO-5 Ultrium 3000 SAS Tape Library	BL537A

Additional Options

HP Disk Backup	NOTE: For the complete range of D2D Backup Systems see: http://www.hp.com/go/d2d. For the complete range of RDX drives and media see: http://www.hp.com/go/rdx. For hardware and software compatibility of HP disk backup products see: http://www.hp.com/storage/SPOCK	
	HP D2D Backup Systems with Backup Data Deduplication	
	HP D2D2502i Backup System NOTE: 1.5TB of usable network disk backup capacity. Network connected appliance with connectivity using the iSCSI protocol. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.	EJ001C
	HP D2D2504i Backup System NOTE: 3.0TB of usable network disk backup capacity. Network connected appliance with connectivity using the iSCSI protocol. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.	EJ002C
	HP RDX Removable Disk Backup Systems USB	
	HP RDX320 Internal Removable Disk Backup System NOTE: For installation into 1U USB Rack-Mount Kit (A8007A). No peripheral bay available for drive installation into the server. 320GB of disk capacity per data cartridge.	AJ767A
	HP RDX500 Internal Removable Disk Backup System NOTE: For installation into 1U USB Rack-Mount Kit (A8007A). No peripheral bay available for drive installation into the server. 500GB of disk capacity per data cartridge.	AJ934A
HP Storage Options	Fibre Channel HBA	
	NOTE: The following is a list of all Fibre Channel Host Bus Adapters for Windows and Linux. For detailed compatibility information please see: http://h18006.www1.hp.com/storage/saninfrastructure/hba.html	
	Brocade Fibre Channel HBAs	
	HP 81B PCIe 8Gb Fibre Channel Single Port Host Bus Adapter	AP769A
	HP 82B PCIe 8Gb Fibre Channel Dual Port Host Bus Adapter	AP770A
	Emulex Fibre Channel HBAs	
	HP 81E 8Gb Single Port PCI-e Fibre Channel Host Bus Adapter	AJ762A
	HP 82E 8Gb Dual Port PCI-e Fibre Channel Host Bus Adapter	AJ763A
	QLogic Fibre Channel HBAs	
	HP 81Q PCI-e Fibre Channel Host Bus Adapter	AK344A
	HP 82Q 8Gb Dual Port PCI-e Fibre Channel Host Bus Adapter	AJ764A
	SCSI HBA	
	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
	Converged Network Adapter	
	HP CN1100E Dual Port Converged Network Adapter	BK835A
	HP CN1000Q Dual Port Converged Network Adapter	BS668A

Additional Options

HP Disk Storage Systems	HP D2000 Disk Enclosures	
	HP D2600 Disk Enclosure	AJ940A
	HP D2700 Disk Enclosure	AJ941A
	NOTE: Please see the QuickSpecs for additional options and configuration information at: http://h18000.www1.hp.com/products/quickspecs/13404_div/13404_div.html	
HP Uninterruptible Power Systems	HP Rack-mountable UPS	
	R7000 Uninterruptible Power System (UPS)	
	HP R7KVA 4U 50A High Voltage NA/JP Uninterruptible Power System	AF462A
	HP R7KVA 4U IEC-32A High Voltage INTL Uninterruptible Power System	AF463A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14110_div/14110_div.html (Worldwide)	
	R5000 Uninterruptible Power System (UPS)	
	HP R5KVA 3U IEC309-32A High Voltage INTL Uninterruptible Power System	AF461A
	HP R5KVA 3U L630 High Voltage NA/JP Uninterruptible Power System	AF460A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14109_div/14109_div.html (Worldwide)	
	HP R5KVA and R7KVA 3U Extended Runtime Module	
	HP R/T3000 G2 Uninterruptible Power System (UPS)	AF464A
	HP R/T3000 G2 2U L530 Low Voltage NA/JP Uninterruptible Power System	AF466A
	HP R/T3000 G2 2U L620 High Voltage NA/JP Uninterruptible Power System	AF467A
	HP R/T3000 G2 2U Detachable Cord High Voltage INTL Uninterruptible Power System	AF468A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14058_div/14058_div.html (Worldwide)	
	HP R1500 G3 Uninterruptible Power Supply (UPS)	
	HP R1.5kVA G3 1U NA Uninterruptible Power System	AF469A
	HP R1.5kVA G3 1U JP/TW Uninterruptible Power System	AF470A
	HP R1.5kVA G3 1U INTL Uninterruptible Power System	AF471A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/14059_div/14059_div.html (Worldwide)	
	NOTE: For additional information on HP Uninterruptable Power Systems please go to: www.hp.com/servers/rackups.	
	NOTE: For additional information on sizing your server, please reference: http://www.upssizer.com	

Additional Options

NOTE: Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: www.hp.com/products/powercords.

HP Power Distribution Units	**HP Monitored Power Distribution Unit: Full Rack Version**	
	HP 17.3kVA 24A Dual Three Phase NA/JP Monitored Power Distribution Unit	AF503A
	HP 8.6kVA 24A Single Input Three Phase NA/JP Monitored Power Distribution Unit	AF504A
	HP 16.6kVA 40A Dual Input Single Phase NA/JP Monitored Power Distribution Unit	AF505A
	HP 8.3kVA 40A Single Input Single Phase NA/JP Monitored Power Distribution Unit	AF506A
	HP 22.1kVA 16A Dual Input Three Phase INTL Monitored Power Distribution Unit	AF507A
	HP 11kVA 16A Single Input Three Phase INTL Monitored Power Distribution Unit	AF508A
	HP 14.7kVA 32A Dual Input Single Phase INTL Monitored Power Distribution Unit	AF509A
	HP 7.3kVA 32A Single Input Single Phase INTL Monitored Power Distribution Unit	AF510A
	HP Monitored Power Distribution Unit: Half Rack Version	
	HP 4.9kVA 24A Single Input Single Phase NA/JP Monitored Power Distribution Unit	AF914A
	HP 7.3kVA 32A Single Input Three Phase INTL Intelligent Modular Power Distribution Unit	AF536A
	HP 17.3kVA 48A Single Input Three Phase NA/JP Monitored Power Distribution Unit	AF916A
	HP 7.3kVA 32A Single Input Single Phase INTL Monitored Power Distribution Unit	AF915A
	HP 22kVA 32A Single Input Three Phase INTL Monitored Power Distribution Unit	AF917A
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12118_div/12118_div.html	
	Modular PDUs 1U/0U	
	NOTE: 1U/0U mounting brackets shipped with the unit (optimized for 10000 G2 and 9000 series racks).	
	HP 2.8kVA 24A Low Voltage NA/JP Modular Power Distribution Unit	252663-D71
	HP 3.6kVA 16A High Voltage INTL Modular Power Distribution Unit	252663-B24
	HP 4.9kVA 24A High Voltage NA/JP Modular Power Distribution Unit	252663-D72
	HP 8.3kVA 40A High Voltage INTL Modular Power Distribution Unit	252663-B21
	HP 8.3kVA 40A High Voltage NA/JP Modular Power Distribution Unit	252663-D73
	HP 8.3kVA 40A High Voltage NA/JP Core Modular Power Distribution Unit	252663-D75
	HP 4.9kVA 24A High Voltage NA/JP Core Modular Power Distribution Unit	252663-D74
	HP 7.3kVA 32A High Voltage INTL Modular Power Distribution Unit	252663-B31
	HP 9.2kVA 40A High Voltage INTL Modular Power Distribution Unit	252663-B32
	HP 9.2kVA 40A High Voltage INTL Core Modular Power Distribution Unit	252663-B34
	HP 7.3kVA 32A High Voltage INTL Core Modular Power Distribution Unit	252663-B33
	HP 22kVA 32A Three Phase INTL Core Modular Power Distribution Unit	AF518A
	NOTE: For additional information on HP Power Distribution Units including accessories please go to: www.hp.com/go/pdu.	

Additional Options

NOTE: Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: www.hp.com/products/powercords.

NOTE: This PDU has a detachable input power cord and allows for adaptability to country specific power requirements.

NOTE: Please see the following QuickSpecs for additional options including shorter jumper cables and country specific power cords: http://h18000.www1.hp.com/products/quickspecs/11041_div/11041_div.html (Worldwide)

HP Intelligent Power Distribution Units (iPDU)	**iPDU Core Units**	
	HP 4.9kVA 24A Single Phase NA/JP Core Intelligent Modular Power Distribution Unit	AF520A
	HP 8.3kVA 40A Single Phase NA/JP Core Intelligent Modular Power Distribution Unit	AF521A
	HP 8.6kVA 24A Three Phase NA/JP Core Intelligent Modular Power Distribution Unit	AF522A
	HP 14.4kVA 40A Three Phase NA/JP Intelligent Modular Power Distribution Unit	AF533A
	HP 17.3kVA 48A Three Phase NA/JP Core Intelligent Modular Power Distribution Unit	AF523A
	HP 11.4kVA 16A 415V Three Phase L22-20 NA Core Intelligent Power Distribution Unit	AF900A
	HP 17.3kVA 24A 415V Three Phase L22-30 NA Core Intelligent Power Distribution Unit	AF902A
	HP 17.3kVA 24A 415V Three Phase IEC309 NA Core Intelligent Power Distribution Unit	AF901A
	HP 7.3kVA 32A Single Phase INTL Core Intelligent Modular Power Distribution Unit	AF525A
	HP 11kVA 16A Three Phase INTL Core Intelligent Modular Power Distribution Unit	AF526A
	HP 22kVA 32A Three Phase INTL Core Intelligent Modular Power Distribution Unit	AF527A
	HP 17.3kVA 48A Three Phase NA/JPN 12 Outlet Intelligent Modular Distribution Unit	AF535A
	HP 17.3kVA 24A 415V Three Phase NA 12 Outlet Intelligent Modular Distribution Unit	AF537A
	HP 22kVA 32A Three Phase INTL 12 Outlet Intelligent Modular Distribution Unit	AF538A
	iPDU Kits with Standard Extension Bars	
	HP 4.9kVA 24A Single Phase NA/JP Intelligent Modular Power Distribution Unit	AF531A
	HP 8.6kVA 24A Three Phase NA/JP Intelligent Modular Power Distribution Unit	AF532A
	HP 7.3kVA 32A Single Phase INTL Intelligent Modular Power Distribution Unit	AF534A
	iPDU Extension Bars	
	HP 5xc13 PDU Extension Bars Kit	AF528A

Additional Options

HP Rack Series	**Rack Intelligent Series rack**	
	HP 642 Intelligent Series rack 1075mm pallet rack	BW903A
	HP 642 Intelligent Series rack 1075mm shock rack	BW904A
	Rack 10000 G2 Series rack	
	HP 10642G2 1200mm Pallet Rack	AF091A
	HP 10642 G2 1200mm deep Shock Rack	AF092A
	HP 10647 G2 1200mm deep Shock Rack	AF094A

NOTE: It is mandatory to use a shock pallet when shipping racks with equipment installed.
NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/12402_div/12402_div.html (Worldwide)
NOTE: For additional information regarding Rack Cabinets and Telco Rack support, please see the following URL: http://www.hp.com/go/rackandpower.
NOTE: The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The 10000 G2 Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors.
CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment: Front and rear doors: If your 42U server rack includes closing front and rear doors, you must allow 5,350 sq cm (830 square inches) of hole evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation). Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 inches).
CAUTION: Always use blanking panels to fill all remaining empty front panel U-spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.
NOTE: Quick deploy rail system provides tool-free support for racks with square or round mounting holes (including Compaq/HP 7000, 9000, 10000 G2 and HP series), with an adjustment range of 24" - 36". The ambidextrous cable management arm can be mounted on either the left or right side for improved cable management.
NOTE: High Airflow Inserts (High Air Flow Rack Door Insert for the 7142 Rack (single) - PN: 327281-B21; or High Air Flow Rack Door Insert for the 7142 Rack (6-pack) - PN: 327281-B22) are required to support the HP ProLiant DL160 in 7000 series racks. Cable Management Arm is not supported on 7000 series racks.
NOTE: Cable management arm must be removed to access hot-plug power supplies when the cable management arm is mounted on the right.

HP Rack Options	**HP USB Keyboard and Mouse**	
	HP USB BFR with PVC Free US Keyboard/Mouse Kit	631341-B21
	HP USB BFR with PVC Free UK Keyboard/Mouse Kit	631344-B21
	HP USB BFR with PVC Free FR Keyboard/Mouse Kit	631346-B21
	HP USB BFR with PVC Free ES Keyboard/Mouse Kit	631348-B21
	HP USB BFR with PVC Free DE Keyboard/Mouse Kit	631358-B21
	HP USB BFR with PVC Free JP Keyboard/Mouse Kit	631360-B21
	HP USB BFR with PVC Free IT Keyboard/Mouse Kit	631362-B21

HP USB BFR with PVC Free CN Keyboard/Mouse Kit	631364-B21
HP USB BFR with PVC Free AE Keyboard/Mouse Kit	638212-B21
HP USB BFR with PVC Free RU Keyboard/Mouse Kit	638214-B21
HP USB BFR with PVC Free IN Keyboard/Mouse Kit	672097-D63
HP USB BFR with PVC Free AP-Intl Keyboard/Mouse Kit	672097-373
HP USB BFR with PVC Free Intl Keyboard/Mouse Kit	672097-B33
HP USB BFR with PVC Free PT Keyboard/Mouse Kit	672097-133
HP USB BFR with PVC Free TR Keyboard/Mouse Kit	672097-143
HP USB BFR with PVC Free CZ Keyboard/Mouse Kit	672097-223
HP USB BFR with PVC Free FI Keyboard/Mouse Kit	672097-353
HP USB BFR with PVC Free SE Keyboard/Mouse Kit	672097-103
HP USB BFR with PVC Free CH Keyboard/Mouse Kit	672097-113
HP USB BFR with PVC Free KR Keyboard/Mouse Kit	672097-KD3
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13972_div/13972_div.html (Worldwide)	
HP Server Console Switches	
HP Server Console 0x2x8 Port Analog Switch	AF616A
HP Server Console 0x2x16 Port Analog Switch	AF617A
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11834_div/11834_div.html (Worldwide)	
HP 1x4 USB/PS2 KVM Console Switch	
HP 1x4 USB/PS2 KVM Console Switch	AF611A
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13474_div/13474_div.html (Worldwide)	
Rack Kits	
HP Rack Cable Management Velcro Clips	379820-B21
HP 1U Small Form Factor Ball Bearing Gen8 Rail Kit NOTE: For SFF models.	663201-B21
HP 1U Gen8 Management Arm Cable	663203-B21
HP 1U Large Form Factor Ball Bearing Gen8 Rail Kit NOTE: For LFF models.	663202-B21
NOTE: For additional information regarding Rack Cabinets and Telco Rack support, please see the following URL: www.hp.com/go/rackandpower.	

Additional Options

HP USB and SD Options	HP 2GB USB Flash Media Drive Key Kit	608447-B21
	NOTE: HP qualified blank USB key for use with HP ProLiant servers that support the VMware virtualization environment and other HP value-add software like SmartStart. HP recommends this industry standard USB flash device for use with VMware ESXi. USB device must be installed in the internal slot of the ProLiant server for use with VMware ESXi. Refer to HP VMware Getting Started Guide for installation instructions.	
	HP 4GB Secure Digital High Capacity Flash Media Kit	580387-B21
	NOTE: Blank SD media device is supported for use with VMware and Citrix. SD media must be installed in the internal slot of the ProLiant server. Learn more at http://www.hp.com/go/proliantvirtualization.	
HP Care Pack Services	HP 3y Nbd DL16x ProCare Service	U3A12E
	HP 3y 4h 24x7 DL16x ProCare Service	U3A18E
	HP 3y Nbd DL16x Collab Support	U1J92E
	HP 3y 4h 24x7 DL16x Collab Support	U1J98E
	HP 3y Nbd ProLiant DL14x/16x HW Supp	U9508E
	HP 3y 4h 13x5 ProLiant DL14x/16x HW Supp	U9509E
	HP 3y 4h 24x7 ProLiant DL14x/16x HW Supp	U9510E
	HP Install ProLiant DL14x/16x Service	U9520E
	NOTE: For more information, customer/resellers can contact: http://www.hp.com/services/carepack	

Memory

HP SmartMemory

New HP SmartMemory now provides additional protection for your servers. With HP Authentication it can verify that you have true HP Qualified Memory in your HP ProLiant Gen8 server. With HP SmartMemory your new HP ProLiant server can take advantage of additional Gen8 enhancements in performance, durability and future manageability support through HP Active Health System.

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator

HP ProLiant DL160 Gen8

NOTE: Memory configurations listed do not apply to "Factory Integrated Models".
NOTE: Considering the thermal constraints, please ensure, all the empty DIMM slots of the installed processors are populated with DIMM blanks. For CTOs, this is taken care of by HP. For processor field upgrades, please note the processor option kits have twelve DIMM blanks which need to be populated on the empty DIMM slots.

Standard Memory

4GB (1x4GB) , 8GB (2 x 4GB) or 16GB(4 x 4GB) depending on model, DDR3-1333MHz Registered RDIMM memory

Maximum Memory

Up to 384GB
NOTE: Charts do not represent all possible memory configurations.

DDR3 memory population guidelines

NOTE: For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator

Some DIMM installation guidelines are summarized below:

- For servers with twenty-four (24) memory slots:
  - There are four (4) channels per processor; eight (8) channels per server
  - There are three (3) DIMM slots for each memory channel; twenty-four (24) total slots
- White DIMM slots denote the first slot of a channel. For 1 DPC (DIMM per channel) populate white slots only.
- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two processor system, only half of the DIMM slots are available.
- When two processors are installed, balance the DIMMs across the two processors.
- To maximize performance, balance the total memory capacity between all installed processors
  - Populate DIMMs from heaviest load (quad-rank) to lightest load (single-rank) within a channel
  - Heaviest load (DIMM with most ranks) within a channel goes furthest from the processor
- Do not mix UDIMMs, RDIMMs or LRDIMMs
- LR DIMMs are supported up to 3 DIMMs per channel.
- DIMMs of different voltages (1.35V & 1.5V) may be mixed in any order
- The system will power them at the higher voltage
- DIMMs of different speed grades may be mixed in any order
  - The system will select a common optimal speed
- To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_div/14225_div.html (Worldwide)

Memory

DIMM slot/capacity/populated speed table								
DIMM Type	Registered DIMMS (RDIMMs)					Unbuffered with ECC DIMMs (UDIMMs)		
DIMM Rank	Single Rank (1R)			Dual Rank (2R)		Single Rank (1R)	Dual Rank (2R)	
DIMM Capacity	4GB	4GB	8GB	8GB	16GB	2GB	4GB	8GB
DIMM Native Speed (MHz)	1333	1600	1600	1333	1333	1333	1333	1333
	LV	Std	Std	LV	LV	LV	LV	LV
SLOTS THAT CAN BE POPULATEDLV								
24 slot servers	24	24	24	24	24	16	16	16
MAXIMUM CAPACITY (GB)								
	96	96	192	192	384	32	64	128
POPULATED DIMM SPEED (MHz)								
1 DIMM Per Channel	1333	1600	1600	1333	1333	1333	1333	1333
2 DIMM Per Channel	1333	1600	1600	1333	1333	1333***	1333***	1333***
3 DIMM Per Channel	1066**	1066	1066	1066**	1066**	n/a	n/a	n/a

NOTES:

Memory speed is a function of the processor QPI bus speed.
* Maximum capacity will vary based on individual server platform qualification schedule
** For HP SmartMemory, RDIMM support 3DPC@1066 at 1.35V. Third party memory may only support up to 3DPC@1066 at 1.5V.
*** For HP SmartMemory, UDIMM is supported at 2DPC@1333. Third party memory may only support up to 2DPC@1066.

DIMM slot and configuration diagrams
Basic memory slot & population diagram

- Population order; start with "A" first, "B" second, "C" third, etc.

24 DIMM SLOTS (12 per CPU node)					
	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A	1	C	Chnl 1
	2	E	2	G	
	3	I	3	K	
Chnl 2	4	B	4	D	Chnl 2
	5	F	5	H	
	6	J	6	L	
Chnl 3	7	L	7	J	Chnl 3
	8	H	8	F	
	9	D	9	B	
Chnl 4	10	K	10	I	Chnl 4
	11	G	11	E	
	12	C	12	A	

Standard memory configuration (1 CPU model)

- 8GB, consisting of four (4) 2GB dual-rank PC3-10600 UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; empty	1	C; empty	Chnl 1
	2	E; empty	2	G; empty	
	3	I; 2GB DIMM	3	K; empty	
Chnl 2	4	B; empty	4	D; empty	Chnl 2
	5	F; empty	5	H; empty	
	6	J; 2GB DIMM	6	L; empty	
Chnl 3	7	L; empty	7	J; empty	Chnl 3
	8	H; empty	8	F; empty	
	9	D; 2GB DIMM	9	B; empty	
Chnl 4	10	K; empty	10	I; empty	Chnl 4
	11	G; empty	11	E; empty	
	12	C; 2GB DIMM	12	A; empty	

Standard memory plus optional memory (1 CPU model)

- 60GB, consisting of three (3) 4GB RDIMMs plus six (6) 8GB RDIMMs
- 3x 4GB dual-rank PC3-10600 RDIMMs
- 6x 8GB dual-rank PC3-10600 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 4GB DIMM	1	C; empty	Chnl 1
	2	E; 8GB DIMM	2	G; empty	
	3	I; 8GB DIMM	3	K; empty	
Chnl 2	4	B; 4GB DIMM	4	D; empty	Chnl 2
	5	F; 8GB DIMM	5	H; empty	
	6	J; empty	6	L; empty	
Chnl 3	7	L; empty	7	J; empty	Chnl 3
	8	H; 8GB DIMM	8	F; empty	
	9	D; 8GB DIMM	9	B; empty	
Chnl 4	10	K; empty	10	I; empty	Chnl 4
	11	G; 8GB DIMM	11	E; empty	
	12	C; 4GB DIMM	12	A; empty	

Memory

Standard memory replaced with optional memory (1 CPU model)
RDIMM maximum configuration

- 192GB, consisting of twelve (12) 16GB quad-rank PC3L-10600 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 16GB DIMM	1	C; empty	Chnl 1
	2	E; 16GB DIMM	2	G; empty	
	3	I; 16GB DIMM	3	K; empty	
Chnl 2	4	B: 16GB DIMM	4	D; empty	Chnl 2
	5	F; 16GB DIMM	5	H; empty	
	6	J; 16GB DIMM	6	L; empty	
Chnl 3	7	L; 16GB DIMM	7	J; empty	Chnl 3
	8	H; 16GB DIMM	8	F; empty	
	9	D; 16GB DIMM	9	B; empty	
Chnl 4	10	K; 16GB DIMM	10	I; empty	Chnl 4
	11	G; 16GB DIMM	11	E; empty	
	12	C; 16GB DIMM	12	A; empty	

UDIMM maximum configuration (1 CPU model)

- 64GB, consisting of eight (8) 4GB dual-rank PC3-10600 UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 8GB DIMM	1	C; empty	Chnl 1
	2	E; 8GB DIMM	2	G; empty	
	3	I; empty	3	K; empty	
Chnl 2	4	B; 8GB DIMM	4	D; empty	Chnl 2
	5	F; 8GB DIMM	5	H; empty	
	6	J; empty	6	L; empty	
Chnl 3	7	L; empty	7	J; empty	Chnl 3
	8	H; 8GB DIMM	8	F; empty	
	9	D; 8GB DIMM	9	B; empty	
Chnl 4	10	K;	10	I; empty	Chnl 4
	11	G; 8GB DIMM	11	E; empty	
	12	C; 8GB DIMM	12	A; empty	

Memory

Standard memory replaced with optional memory (2 CPU model)
RDIMM maximum configuration

- 384GB, consisting of twenty-four (24) 16GB dual-rank PC3-10600 RDIMMs DDR3 Registered (RDIMM) memory, operating at 1333MHz or 1066MHz when populated at 3 DIMMs per Channel in 24 slots.

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 16GB DIMM	1	C; 16GB DIMM	Chnl 1
	2	E; 16GB DIMM	2	G; 16GB DIMM	
	3	I; 16GB DIMM	3	K; 16GB DIMM	
Chnl 2	4	B; 16GB DIMM	4	D; 16GB DIMM	Chnl 2
	5	F; 16GB DIMM	5	H; 16GB DIMM	
	6	J; 16GB DIMM	6	L; 16GB DIMM	
Chnl 3	7	L; 16GB DIMM	7	J; 16GB DIMM	Chnl 3
	8	H; 16GB DIMM	8	F; 16GB DIMM	
	9	D; 16GB DIMM	9	B; 16GB DIMM	
Chnl 4	10	K; 16GB DIMM	10	I; 16GB DIMM	Chnl 4
	11	G; 16GB DIMM	11	E; 16GB DIMM	
	12	C; 16GB DIMM	12	A; 16GB DIMM	

UDIMM maximum configuration (2 CPU model)

- 128GB, consisting of sixteen (16) 8GB dual-rank PC3-10600E DDR3 Unbuffered (UDIMM) memory operating at 1333MHz when populated at 2 DIMMs per Channel in 16 slots

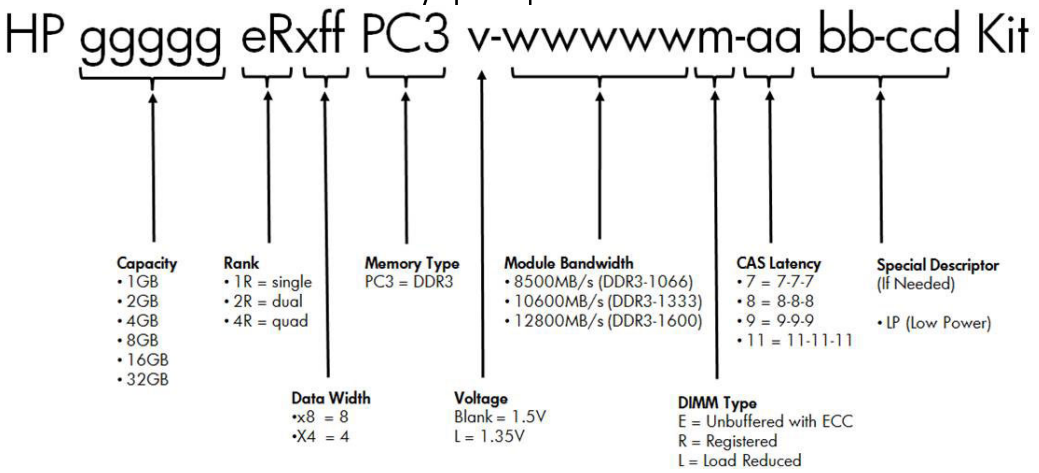
	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 8GB DIMM	1	C; 8GB DIMM	Chnl 1
	2	E; 8GB DIMM	2	G; 8GB DIMM	
	3	I; empty	3	K; empty	
Chnl 2	4	B; 8GB DIMM	4	D; 8GB DIMM	Chnl 2
	5	F; 8GB DIMM	5	H; 8GB DIMM	
	6	J; empty	6	L; empty	
Chnl 3	7	L; empty	7	J; empty	Chnl 3
	8	H; 8GB DIMM	8	F; 8GB DIMM	
	9	D; 8GB DIMM	9	B; 8GB DIMM	
Chnl 4	10	K; empty	10	I; empty	Chnl 4
	11	G; 8GB DIMM	11	E; 8GB DIMM	
	12	C; 8GB DIMM	12	A; 8GB DIMM	

NOTE: Capacity references are rounded to the common Gigabyte values.

Memory

- 1GB = 1024MB
- 2GB = 2048MB
- 4GB = 4096MB
- 8GB = 8192MB
- 16 GB=16384MB

DDR3 memory options part number decoder



Following are memory options available from HP:

HP Memory

NOTE: HP memory from previous generation servers are not qualified or warranted with this HP ProLiant Server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_div/14225_div.html

NOTE: LRDIMM, RDIMM and UDIMMs are all distinct memory technologies and cannot be mixed within a server. The majority of ProLiant Gen8 servers support RDIMM, UDIMM and LRDIMM.

Registered DIMMs (RDIMMs)

HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647901-B21
HP 8GB (1x8GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647899-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647897-B21
HP 4GB (1x4GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647895-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21

Unbuffered with ECC DIMMs (UDIMMs)

HP 8GB (1x8GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647909-B21

Memory

HP 4GB (1x4GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647907-B21
HP 2GB (1x2GB) Single Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647905-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.
NOTE: Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: http://www.hp.com/go/proliant-energy-efficient

1-4 Four LFF Hot-plug SAS/SATA hard drive bays

A Optional DVD-ROM, or DVD RW

1-8 Eight SFF Hot-plug SATA/SAS hard drive bays

A Optional DVD-ROM, or DVD RW

Drive Support

	Quantity Supported	Position Supported	Controller
Removable Media			
DVD-ROM	Up to 1	A	Integrated IDE (ATAPI) (optional)
DVD RW	Up to 1	A	Integrated IDE (ATAPI) (optional)

Hard Drives

NOTE: Embedded SATA controller supports up to 3Gb/s speed in HP ProLiant DL160 Gen8. HP Smart Array controller is required to achieve 6Gb/s.

NOTE: HP Smart Array controller is required for RAID capabilities. Embedded SATA controller does not support RAID.

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SAS Hot Plug Smart Drive LFF (3.5-inch) Enterprise Drives

	Quantity Supported	Position Supported	Controller
600GB 6G SAS 15K 450GB 6G SAS 15K	Up to 4	1-4	HP Smart Array P420/ 1G FBWC controller

SAS Hot Plug Smart Drive LFF (3.5-inch) Midline Drives

	Quantity Supported	Position Supported	Controller
3TB 6G SAS 7.2K 2TB 6G SAS 7.2K 1TB 6G SAS 7.2K	Up to 4	1-4	HP Smart Array P420/ 1G FBWC controller

Storage

SAS Hot Plug Smart Drive SFF (2.5-inch) Enterprise Drives

	Quantity Supported	Position Supported	Controller
900GB 6G SAS 10K 600GB 6G SAS 10K 450GB 6G SAS 10K 300GB 6G SAS 15K 300GB 6G SAS 10K 146GB 6G SAS 15K 72GB 6G SAS 15K	Up to 8	1-8	HP Smart Array P420/ 1G FBWC controller

SAS Hot Plug Smart Drive SFF (2.5-inch) Midline Drives

	Quantity Supported	Position Supported	Controller
1TB 6G SATA 7.2K 500GB 6G SATA 7.2K	Up to 8	1-8	HP Smart Array P420/ 1G FBWC controller

6G SATA Hot Plug with Smart Drive LFF (3.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
3TB 6G SATA 7.2K 2TB 6G SATA 7.2K 1TB 6G SATA 7.2K 500GB 6G SATA 7.2K	Up to 4	1-4	HP Smart Array P420/ 1G FBWC controller

6G SATA Hot Plug with Smart Drive SFF (2.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
1TB 6G SATA 7.2K 500GB 6G SATA 7.2K	Up to 4	1-4	HP Smart Array P420/ 1G FBWC controller

6G SAS SLC Hot Plug SFF (2.5-inch) Enterprise Performance Solid State Drives

	Quantity Supported	Position Supported	Controller
400GB 6G SAS SLC SFF SSD 200GB 6G SAS SLC SFF SSD	Up to 8	1-8	HP Smart Array P420/ 1G FBWC controller

6G SAS MLC Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

	Quantity Supported	Position Supported	Controller

Storage

800GB 6G SAS MLC SSD SFF 400GB 6G SAS MLC SSD SFF 200GB 6G SAS MLC SSD SFF	Up to 8	1-8	HP Smart Array P420/ 1G FBWC controller

3G SATA MLC Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

	Quantity Supported	Position Supported	Controller
400GB 3G SATA MLC 200GB 3G SATA MLC 100GB 3G SATA MLC	Up to 4	1-4	HP Smart Array P420/ 1G FBWC controller

External Storage

	Quantity Supported	Position Supported	Host Controller or Adapter
D2600 Disk Enclosure	Up to 4	External	HP Smart Array P222/512MB FBWC Controller
	Up to 8	External	HP Smart Array P421/1GB FBWC Controller
			HP Smart Array P421/2GB FBWC Controller
D2700 Disk Enclosure	Up to 4	External	HP Smart Array P222/512MB FBWC Controller
	Up to 8	External	HP Smart Array P421/1GB FBWC Controller
			HP Smart Array P421/2GB FBWC Controller

Tape and Disk Backup

NOTE: For the complete range of tape drives, autoloaders, libraries and media, including the internal fitting models, see: http://www.hp.com/go/tape. For the complete range of D2D Backup Systems see: http://www.hp.com/go/d2d. For the complete range of RDX drives and media see: http://www.hp.com/go/rdx. For hardware and software compatibility of HP disk and tape backup products see: http://www.hp.com/storage/SPOCK.

	Position Supported	Controller	Controller/HBA Option Kit Part Number
HP SCSI Tape Drives LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO4 Ultrium 1760 LTO-4 Ultrium 1840 DAT 72 DAT 160 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21

Storage

HP USB Tape Drives DAT 72 DAT 160 1U USB Rack-Mount Kit	External	USB 2.0 Port	N/A
HP SAS Tape Drives DAT 160 LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO-4 Ultrium 1760 LTO-4 Ultrium 1840 LTO-5 Ultrium 3000 LTO-5 Ultrium 3280 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP Smart Array P222/512 FBWC 6Gb 1-port Int/1-port Ext SAS Controller	631667-B21
HP SCSI Tape Autoloaders 1/8 G2 Autoloader	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
HP SCSI Tape Libraries MSL2024 MSL4048 MSL8096	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
HP SAS Tape Autoloaders and Libraries 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP Smart Array P222/512 FBWC 6Gb 1-port Int/1-port Ext SAS Controller	631667-B21
HP Fibre Channel Tape Libraries MSL2024 MSL4048 MSL8096	External	Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for connectivity information and the supported Fibre Channel HBAs shown in this QuickSpecs.	
HP USB RDX Removable Disk Backup System RDX160 RDX320 RDX500 RDX 1TB	External	USB 2.0 port	N/A

Storage

HP D2D Backup Systems, iSCSI D2D2500i D2D4000i	Rack Mount	Embedded Network Controller. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.
HP D2D Backup Systems, Fibre Channel D2D4000fc	Rack Mount	Direct server attach is not supported, requires connection via SAN fabric. See: http://www.hp.com/storage/SPOCK

System Unit	**Dimensions** (H x W x D) (with bezel)	4 LFF	1.7" (43.2mm) Height x 17.1" (434.6mm) Width x 29.5" (750mm) Length	
		8 SFF	1.7" (43.2mm) Height x 17.1" (434.6mm) Width x 27.5" (699mm) Length	
	Weight (approximate)	Maximum (all hard drives, power supplies, and processors installed)	33..00 lb (15.2kg)	
		Minimum (one hard drive, power supply, and processor installed)	31 lb (14.1kg)	
	Input Requirements (per power supply)	Rated Line Voltage	100 to 120 VAC, 200 to 240 VAC	
		Rated Input Current	10 A at 100 VAC 5 A at 200 VAC	
		Rated Input Frequency	50 Hz to 60 Hz	
	BTU Rating	Rated Input Power	562 W at 100V AC input 562 W at 200V AC input	
		Maximum	500W	1917 at 100 V AC 1898 at 115 V AC 1856 at 200 V AC 1850 at 230 V AC
			460W	1764 at 100V AC 1736 at 115V AC 1694 at 200V AC 1687 at 230V AC
			750W	2878 at 100 V AC 2834 at 115 V AC 2769 at 200 V AC 2758 at 230 V AC
	Power Specifications	To review typical system power ratings use the Power Advisor which is available via the online tool located at URL: www.hp.com/go/proliant-energy-efficient Or www.hp.com/go/hppoweradvisor - Click on the system of interest. Example: DL160 G8 - Follow the instructions of the next screens.		
	Power Supply Output (per power supply)	Rated Steady-State Power	500 Watts (at 100 VAC), 500 Watts (at 200 VAC)	
		Maximum Peak Power (See Power Specifications Tables)	500Watts (at 100 VAC), 500 Watts (at 200 VAC)	
	System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is	

		10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).
	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).
Relative Humidity (non-condensing)	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
	Non-operating	5 to 95% relative humidity (Rh), 38.7° C (101.7° F) maximum wet bulb temperature, non-condensing
Altitude	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

Acoustic Noise

Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).

NOTE: The listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels.

Idle

LWAd	5.1 B (1P SKU) 5.2 B (2P SKU)
LpAm	36.1 dBA (1P SKU) 36.6 dBA (2P SKU)

Operating

LWAd	5.2 B (1P SKU) 5.6 B (2P SKU)
LpAm	36.6 dBA (1P SKU) 41.5 dBA (2P SKU)

Emissions Classification (EMC)	FCC Rating	Class A
	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1

NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

HP iLO 4 On System	**Architecture**	PCI Express based health and remote management ASIC

Technical Specifications

Management Processor	Processor	PCI Express RISC processor core running at 400MHz
	Upgradeability	Option firmware upgradeable via Flash ROM
	Video Support	1920 x 1200 (16 bpp) DVR max resolution
	Interfaces	One Ethernet Sideband connection (10/100/1000 Mb/s) One Ethernet network LAN connection (1 Gbps) for rack, towers and SL systems One Ethernet network LAN connection (10/100 Mb/s) for Blade Systems
	Memory	16 MB Flash
		256 MB DDR 3 with ECC (112 MB after ECC and video)
	Operating System Support	Microsoft Windows 2008 R2
		Microsoft Windows 2008 (32 bit and 64 bit)
		Microsoft Windows Server 2008 Standard Edition (32 bit and 64 bit)
		Microsoft Windows Server 2008 Enterprise Edition (32 bit and 64 bit)
		Red Hat Enterprise Linux 5.7 (32 bit and 64 bit)
		Red Hat Enterprise Linux 6.0 (32 bit and 64 bit)
		SUSE LINUX Enterprise Server 11 (32 bit and 64 bit)
		SUSE LINUX Enterprise Server 10 (32 bit and 64 bit)
		VMware ESX 4.1
		VMware ESXi 5.0
	Client System Support	Red Hat Enterprise Desktop 5.00
		SUSE Linux Enterprise Desktop 11
		SUSE Linux Enterprise Desktop 10
		Windows 7
		Microsoft Windows XP Professional Edits
		Microsoft Windows Vista Business and Ultimate Editions
	Client Browser Support	Microsoft Internet Explorer 9 NOTE: For customers using Protected Mode, please use the Java based version of Integrated Remote Console.
		Microsoft Internet Explorer 8 NOTE: For customers using Protected Mode, please use the Java based version of Integrated Remote Console.
		Firefox Extended Support Release (ESR) 10 (on supported Windows and Linux systems
		Firefox 3.6 (on supported Windows and Linux systems)
	Client Browser Support	Secure Shell and serial port access
		Secure Socket Layer
		Secure Shell version 2
	Security	Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface
		AES encryption of video
		RC4 encryption of video
	Directory Support Services	Active Directory v1.0 (Windows 2003)

	Management protocols supported	SNMP, IPMI 2.0 (system and LAN interface), DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP), HP RIBCL XML
HP Ethernet 1Gb 2-port 361i Adapter	Network Interface	10Base-T/100Base-TX/1000Base-TX
	Capability	IEEE 802.3 10Base-T IEEE 802.3ab 1000Base-T IEEE 802.3u 100Base-TX IEEE 1588, IEEE 802.1AS
	Data Transfer Method	PCI Express v 2.1, 5.0 GT/s and 2.5 GT/s bus speeds and supports for x1, x2, x4 links widths (Lanes)
	Controller	I350 Powerville
	Network Transfer Rate	10Base-T (Half-Duplex) 10 Mb/s per port, 20 Mb/s Combined 10Base-T (Full-Duplex) 20 Mb/s per port, 40 Mb/S Combined 100Base-TX (Half-Duplex) 100 Mb/s per port, 200 Mb/s Combined 100Base-TX (Full-Duplex) 200 Mb/s per port, 400 Mb/s Combined 1000Base-TX (Half and Full-Duplex) 1000Mb/s per port, 2000 Mb/s Combined
	Connector	RJ-45
	Cable Support	10Base-T Categories 3, 4 or 5 UTP; up to 328 ft (100 m) 10/100/1000Base-TX Category 5 UTP; up to 328 ft (100 m)
HP Embedded SATA controller	Disk Drive and Enclosure Interface	6Gb/s SATA (Serial ATA)
	SATA Connectors	6 internal connectors
	Server Interface	embedded PCIe 2.0 provides 1GB/s maximum bandwidth
	SATA Speed	6Gb/s SATA links provide 4.8GB/s maximum bandwidth
	Cache Memory	Upgradable to 512MB FBWC
	Physical Drives Supported	Up to 6 physical drives
	Hot Plug Support	Yes

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

© Copyright 2012 Hewlett-Packard Development Company, L.P.

The information contained herein is subject to change without notice.

Microsoft and Windows NT are US registered trademarks of Microsoft Corporation. Intel, the Intel logo, Xeon and Xeon Inside are trademarks of Intel Corporation in the U.S. and other countries.

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.